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Junctural and parasitic voicing in Burmese¹

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In this paper I address some of the complications that arise concerning consonant voicing in Burmese. Burmese is typically cited in phonological work for its contrast between voiced and voiceless sonorants, especially nasals (Ladefoged & Maddieson 1994:111). The full consonant system is indicated in (1) (cf. Roop 1972).

(1) Consonants (all found in onsets of syllables)

p	t	c	k	ʔ
ph	th	ch	kh	
(b)	(d)	(j)	(g)	
	θ	s		h
	sh			
	(ð)	(z)		
m	n	ɲ	ŋ	
hm	hn	hn̥	hn̥ŋ	
w	l	y		
	hl	hy		

Note that I have indicated voiced obstruents in parentheses, since they are only marginally phonemic in Burmese, mostly found in loanwords. On the other hand,

¹ I would like to thank Jim Matisoff, Larry Hyman, and Sharon Inkelas for their guidance and suggestions for this paper. The collection of data for this paper began in 1999 for Prof. Hyman's course: Ling.111 'Introduction to Phonology'. I would like to thank Ko Moe Zaw and Ko Maung Maung Nyo for allowing me to check with them the pronunciation of the data used in this paper. Ko Moe Zaw is a Burmese from Rangoon (Lower Burma Burmese), and Ko Maung Maung Nyo is a visiting scholar in Journalism here at UCB. He is from Mon Yua (Upper Burma Burmese). Because they were very consistent with the voicing phenomena described in the *Myanmar-English Dictionary* (MED 94), later collections were mainly done from the MED. The data collection is quite extensive, but not exhaustive enough to give an accurate statistical evaluation. Needless to say, all the mistakes are mine.

derived voiced stops will be the focus of the present study. In particular, we shall be interested in the voicing counterparts indicated in (2).

(2)

voiceable	plain	p	θ	t	s	c	k
	aspirated	ph		th	s ^h	ch	kh
voiced counterpart		b	ð	d	z	j	g

Specifically we will analyze the conditions under which so-called “voiceable” consonants become their voiced counterpart. (Curiously, voiceless sonorants do not undergo voicing). To understand this, we need to consider the vowel system and two types of rhymes in Burmese. As seen in (3), vowels in open syllables can be oral or nasalized (marked as \tilde{n})², and the only type of closed syllables ends in a glottal stop (cf. Matisoff 1976:v)³.

(3) Rhymes

Checked			Open			
i?	u?		iñ	uñ	i	u
ei?	ou?		eiñ	ouñ	ei	ou
e?					wei	
we?					e	o
ai?	au?		aiñ	auñ	we	
	a?		añ			
					a	
					wa	

The first source of voiced obstruents in Burmese is schematized in (4).

(4) Junctural voicing

[voiceless obstruents] → [+voice] / V + ___ V

As seen in (4), voiceless obstruents become voiced intervocalically by a process which I term “junctural voicing”. This occurs obligatorily in several grammatical contexts. First, voicing occurs on the second element of a compound (cf. 5).

² Following Okell 1969:6, nasalized vowels are marked by a symbol \tilde{n} so that tones can be marked on the vowels. Tones are marked as follows: heavy tone by grave accent [`], level as unmarked, and creaky tone by acute accent [´].

³ Glottal stop is often considered to be a tonal feature because all syllables ending with glottal stop are pronounced with the same short high checked tone.

(5) Compounding

a.	p > b pè + 'peanut'	pou? ----> 'rot/putrid'	pè-bou? 'fermented soybean'
b.	t > d khè + 'lead'	tañ ----> 'stick'	khè-dañ 'pencil'
c.	c > j pè + 'peanut'	cì ----> 'big'	pè-jì 'lablab bean'
d.	k > g naiñ + 'win/can'	kwe? ----> 'spot'	naiñ-gwe? 'trump card'
e.	θ > ð pàñ + 'flower'	θì ----> 'fruit'	pàñ-ðì 'apple'
f.	s > z kouñ + 'goods'	sèiñ ----> 'be green'	kouñ-zèiñ 'raw materials'

The examples in (6) show the same phenomenon occurring in reduplication.

(6) Reduplication

a.	pyauñ + 'be plain'	pyauñ ----> 'be plain'	pyauñ-byauñ 'bluntly'
b.	té + 'be straight'	té ----> 'be straight'	té-dé 'straight- forward'
c.	ci + 'joyous'	ci ----> 'joyous'	ci-ji 'cheerfully'
d.	kàuñ + 'be good'	kàuñ ----> 'be good'	kàuñ-gàuñ 'properly'

- | | | | | | | |
|----|----------------|---|----------------|-------|-----------|---------------------|
| e. | θouñ
'blow' | + | θouñ
'blow' | ----> | θouñ-ðouñ | '(blow)
briskly' |
| f. | sò
'early' | + | sò
'early' | ----> | sò-zò | 'be ahead
of' |

Finally, in (7), we see that certain grammatical markers also become voiced.

(7) Grammatical markers (subject, object, politeness etc.)⁴

- | | | |
|----|--|--------------|
| a. | ka
thu. hsi ga. ya de
3P.G place SUB get RLS
'I got (it) from him' | MS : 257 (4) |
| b. | kou 'Object (OBJ) Marker'
kou=ei: gou thu ga. tha' te
HON=name OBJ 3P SUB kill RLS
'He killed Ko Aye' | MS: 99 (9) |
| c. | pa 'Politeness (POL) Marker'
sa. ja ba zou.
start PLU POL HORT
'Let's start, shall we?' | MS: 126 (10) |

As indicated in the informal rule in (4), the affected consonant must be preceded by a vowel. As seen in (8), voicing will not accompany the compounding process if the first word ends in glottal stop.

(8) Compounding

- | | | | | | | |
|----|-----------------|---|----------------------|-------|----------|---------------------------|
| a. | θi?
'tree' | + | pou?
'rot/putrid' | ----> | θi?-pou? | 'malodorous
wood-tree' |
| b. | cau?
'stone' | + | tañ
'stick' | ----> | cau?-tañ | 'slate pencil' |

⁴ Grammatical markers are collected from Myint Soe's dissertation (MS). Following the *Myanmar-English Dictionary* (1993), Myint Soe (cf. MS:13) explains that he represents glottal stop as a comma at the end of the syllable, and voicing is indicated by underlining the consonant. In this paper, those underlined consonants are transcribed as voiced consonants. Myint Soe also transcribes s^h as *hs*.

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c.	cau?	+	cì	---->	cau?-cì	'kind of smallpox'
	'small pox'		'big'			
d.	pye?	+	kwe?	---->	pye?-kwe?	'absence'
	'miss'		'spot'			
e.	θi?	+	θì	---->	θi?-θì	'fruit'
	'tree'		'fruit'			
f.	cau?	+	sèiñ	---->	cau?-sèiñ	'jade'
	'stone'		'be green'			

Similarly, as seen in (9), voicing will not occur in reduplication if the base ends in a glottal stop.

(9) Reduplication

a.	kau?	+	kau?	---->	kau?-kau?	'curly'
	'curl'		'curl'			
b.	cau?	+	cau?	---->	cau?-cau?	'in fear'
	'fear'		'fear'			
c.	sou?	+	sou?	---->	sou?-sou?	'(sink) without a trace'
	'suck'		'suck'			

Finally, in (10), we see that grammatical markers will not get voiced if they are preceded by glottal stop.

(10) Grammatical marker

- a. ká 'Subject (SUB) marker' MS: 77 (9)
- thu. hcei=htau' **ka.** nga. gaun: gou hti. nei de
 3P.G leg SUB 1P.G head OBJ touch stay RLS
 'his leg is touching my head'
- b. kou 'Object (OBJ) Marker' MS: 264 (35)
- sa=ywe' **kou** hkau' pa
 paper OBJ fold POL
 'Please fold the paper'

- c. pa ‘Politeness (POL) Marker’ MS: 126 (10)

pyan lai’ pa oun: me
 return away POL AUX IRR
 ‘I am leaving (going home)’

As seen in (11), loanwords also follow the above general rules of junctural voicing.

(11) Loan words

- | | | | | | | |
|----|---|---|---------------------------------|-------|--|-------------|
| a. | kouñ
‘goods’
[native BS] | + | kà
‘car’
[< ENG] | ----> | kouñ-ga | ‘lorry car’ |
| b. | s ^h ai?
‘side’
[< ENG] | + | kà
‘car’
[< ENG] | ----> | s ^h ai?-ka
[< ENG: side car] | ‘trishaw’ |
| c. | gai?
‘yard’
[< Hindi] | + | tañ
‘stick’
[native BS] | ----> | gai?-tañ | ‘yardstick’ |

The second source of voiced obstruents in Burmese are aspirated obstruents. Note however that, as seen in (12), aspirated sonorants such as *hm*, *hmy*, *hn*, *hny*, *hŋ*, *hl*, *hy* are not voiceable, and remain unchanged in contexts that otherwise produce junctural voicing (cf. Okell 1969: 13).

(12) Aspirated Sonorants

- | | | | | | | |
|----|----------------|---|----------------|-------|----------|----------------|
| a. | θà
‘animal’ | + | hmwè
‘hair’ | ----> | θà-hmwè | ‘animal fur’ |
| b. | koù
‘nine’ | + | hni?
‘car’ | ----> | koù-hni? | ‘nine years’ |
| c. | nwà
‘cow’ | + | hlè
‘cart’ | ----> | nwà-hlè | ‘bullock cart’ |

In contrast to aspirated sonorants, as seen in (13), aspirated obstruents can undergo junctural voicing.

(13) Aspirated Obstruents

a.	sà 'eat'	+	phà 'frog'	---->	sà-bà	'seasoned opportunist'
b.	kà 'picture'	+	cha? 'flat thing'	---->	kà-ja?	'cardboard, chart'
c.	shèi 'medicine'	+	khàn 'room'	---->	shèi-gàn	'clinic'
d.	pè 'peanut'	+	shi 'oil'	---->	pè-zi	'peanut oil'
e.	sà 'eat'	+	khwe? 'cup'	---->	sà-gwe?	'dishes'

Burmese has another voicing alternation phenomenon which I refer to as “parasitic voicing”. In order to understand this phenomenon, it is necessary to first understand Burmese rhyme reduction.

In Burmese compounding, as seen in (14), the rhyme of the first syllable can reduce, and this reduced vowel may be represented as [ə].

(14) Rhyme reduction

a.	phà 'frog'	+	pyañ 'fly'	---->	phə-byañ	'tree frog species'
b.	phà 'frog'	+	pyou? 'boil'	---->	phə-byou?	'toad'
c.	θu 'person'	+	cì 'be big'	---->	θə-jì	'chief'

Note that rhyme reduction in (14) is not because of voicing on the initial consonant of the following syllable. In other words, rhyme reduction occurs independently of junctural voicing, otherwise, there could not be rhyme reduction in (15) where the second syllable is already a voiced nasal.

(15)a.	pà 'cheek'	+	moú 'mound'	---->	pə-moú 'prominence of cheek'
--------	---------------	---	----------------	-------	---------------------------------

- | | | | | | | | |
|----|---------------|---|-------------------|---|----------------|-------|--|
| b. | pà
'cheek' | + | mòuñ
'hate' | + | hmwè
'hair' | ----> | pə-mòuñ-hmwè
'sideburns' |
| c. | θà
'flesh' | + | nañ
'smell' | + | yi | ----> | θə-nañ-yi
'liquid' 'pus' |
| d. | tɪ?
'one' | + | naiñ
'win/can' | | | ----> | tə-naiñ
'work within one's
capacity' |

In fact, as seen in (16), rhyme reduction (sometimes even onset reduction) occurs even in disyllabic compounds where both constituents have nasal initials.

(16) Rhyme reduction in disyllabic compounds

- | | | | | | | |
|----|---------------|---|-----------------|-------|----------|--------------------------|
| a. | nwà
'cow' | + | má
'female' | ----> | nə-má | 'cow (female)' |
| b. | hna
'nose' | + | màuñ
'lever' | ----> | hnə-màuñ | 'trunk (of an elephant)' |

In addition, as seen in (17), rhyme reduction occurs when the second syllable is aspirated sonorants which remain unchanged in contexts that otherwise produce junctural voicing.

(17) Rhyme reduction with voiceless sonorants as second syllable

- a. thañ + hŋa? ----> thə-hŋa? ‘wooden clamp’
 ‘toddy’ ‘clamp’
- b. s^hañ + hnei? ----> s^hə-hnei? ‘hair clip’
 ‘hair’ ‘press’

Although the reduced syllable *Cə* loses its tonal contrast and rhyme quality, it maintains its syllabicity in the compound. As seen in (18), number one *ti?* is always reduced when it precedes a classifier.

(18) Reduced number one

- a. ti? + pa? ----> tə-ba? 'one round'
'one' 'round'
- b. ti? + ma? ----> tə-ma? 'one fourth'
'one' 'quarter'

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- c. ti? + hlwà ----> tə-hlwà 'the whole'
'one' 'range'

But as shown in (19), this number does not reduce when preceding other numbers.

(19) Non-reduced number one⁵

- shē + ti? ----> shé-ti? 'eleven'
'ten' 'one'

In cases where the first syllable reduces to *Cə*, junctural voicing may be extended leftward to the onset of the first syllable (cf. 20). I refer to such cases as parasitic voicing, a “non-local” process in the sense that consonant voice assimilation skips over a vowel.

(20) Parasitic Voicing

- a. shañ + thòu ----> zə-dòu 'hairpin'
'hair' 'pinch'
- b. shañ + kha ----> zə-ga 'sieve'
'rice' 'shake'
- c. θwà + te? ----> ðə-de? 'canine tooth'
'tooth' 'rise'
- d. sà + pwè ----> zə-bwe 'table'
'eat' 'feast'
- e. tañ + chu ----> də-ju 'pole for picking
'stick' 'pick (fruit)' fruit'
- f. pyà + tu ----> bə-du 'hornet'
'bee' 'hammer'

As seen in (21 & 22) parasitic voicing is optional in some cases.

⁵ There should be junctural voicing on the initial consonant of the second syllable in the compound *shé-ti?* 'eleven'. As Thurgood noted however, creaky tone can result from fusion of the genitive marker *ʔi?* to the possessive noun. In such cases, because the genitive marker *ʔi?* ends in a glottal stop, it subsequently prevents junctural voicing. Notably, *shé-ti?* 'eleven' is a result of *she + ʔi? + ti?* 'ten + of + one' (cf. Thurgood 1981:57).

- (21) a. kǎñ + pà ----> kə-bà 'bank of a river'
 b. 'bank' 'vicinity' > gə-ba
- (22) a. cǎñ + pòu ----> cə-boù 'bed bug'
 b. 'floor' 'insect' > jə-boù

In rare cases, as in (23 & 24), two degrees of reduction are attested in relation to parasitic voicing.

- (23) a. thǎñ + pin ----> thə-biñ 'toddy palm'
 b. 'toddy' 'tree' > tə-biñ
 c. > də-biñ
- (24) a. khà + paʔ ----> khə-baʔ 'belt'
 b. 'waist' 'go round' > kə-baʔ
 c. > gə-baʔ

Note that in order for parasitic voicing to occur, voicing must be acquired on the initial consonant of the following syllable. As seen in (25), if the first syllable is reduced in Burmese compounding, aspirated obstruents in the second syllable might not undergo voicing.

- (25) σ + asp. obst. > σ + rime reduction - asp. obst.
- a. pà + cha íñ ----> pə-cha íñ 'dimple'
 'cheek' 'crack'
- b. pà + chouʔ ----> pə-chouʔ 'muzzle'
 'cheek' 'control'
- c. θu + khù ----> θə-khù 'thief'
 'person' 'steal'
- d. sa + chi ----> sə-chi 'secretary'
 'letter' 'lift'
- e. sà + phou ----> sə-phou 'fireplace,
 'eat' 'bellow' kitchen'

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f.	sà 'eat'	+	khwe? 'cup'	---->	sə-khwe?	'trough, manger'
----	-------------	---	----------------	-------	----------	------------------

In the Burmese lexicon, there are some native head-entry words which begin with voiced consonants in modern Burmese (most voiced consonants are in loanwords in modern Burmese). The writing system [Written Burmese (WB)] shows that those native voiced consonants are very likely the result of reanalyses, i.e. the second syllable of the compound is reanalyzed as an independent word. For example, the full Burmese word for 'head' is ?ù-gàuñ [< WB: ?ù-khàuñ], which literally means 'head-hollow' (cf. 26). In this two syllable compound, the first syllable does not reduce to Cə, which mean that there would be voicing assimilation on the initial consonant of the second syllable (cf. 13). It appears that over time the Burmese reanalyzed the second voiced consonant (which was the result of junctural voicing) as an independent word (cf. Okell 1969:114).

(26) Reanalysis (cf. Junctural voicing rule in (13))

?ù-khàuñ > ?ù-gàuñ > gàuñ MED:61

As mentioned above (cf.12), aspirated sonorants are not voiceable, and therefore, remain unchanged in contexts that otherwise produce voicing. As seen in (27), there are a few exceptions to this rule.

(27) Exceptions

a. hnǎñ + 'sesame'	pha? + 'substance'	chin ----> 'sour'	nə-ba?-chin 'sesame oil-cake'	MED:247
b. kou + 'body'	sà + 'instead'	hle ----> 'exchange'	kou-zə-le 'delegate'	MED:25
c. hŋe? + 'bird'	pyò 'long object'	---->	ŋə-byò 'banana'	MED:100

Conclusion

Intervocalic voicing assimilation occurs in Burmese compounding, reduplication, and with grammatical markers, which I refer to as junctural voicing. If the second syllable's onset is a voiceless obstruent, junctural voicing occurs (cf. 5). In cases where the second syllable begins with an aspirated obstruent, if the first syllable does not reduce to [ə], voicing will appear in the onset of the second syllable (cf. 13).

In cases where the first syllable reduces to Cə, junctural voicing may spread leftward to the onset of the first syllable. I refer to such cases as parasitic voicing, a

“non-local” process in the sense that consonant voice assimilation skips over a vowel. As schematized in (28), parasitic voicing occurs optionally. It appears that this alternation is somewhat lexicalized, and is not predictable based upon some natural class.

(28) Parasitic Voicing

a. Voiceless Obstruents

vl. obst. + voiceable obst. > vl./**vd**_[+ reduction] + **vd**. obst. (cf. 21 &22)

b. Voiceless Aspirates

vl. asp. + voiceable obst. > asp./vl./**vd**_[+reduction] + **vd**. obst. (cf. 23 &24)

Parasitic voicing seems to happen because the minor syllable of the resulting sesquisyllabic structure (Matisoff 1973) is so reduced that voicing is allowed to spread leftward, on condition that voicing has occurred (or has been acquired) on the second syllable. Note that, de-aspiration occurs optionally in the onset of the first syllable in parasitic voicing (cf. 24b & 25b).

It appears that the language is acquiring some phrase-initial phonemic voiced consonants in its lexicon by way of reanalysis.

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